PATENT
Attorney Docket No.: A-57496/DJB

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:	Examiner: ZISKA, S.
WEISS, et al.	Group Art Unit: 1804
Serial No. 07/961,813	
Filed: 16 October 92	
For: REMYELINATION USING NEURAL STEM CELLS	

CERTIFICATE OF MAILING

I hereby certify that this correspondence, including listed enclosures, is being deposited with the United States Postal Service as First Class Mail in an envelope addressed to: Commissioner of Patents and Trademarks, Washington, DC 20231 on ~~MARCH 29, 1994~~. 31 May 1994. vh 31 May 94

Signed: Vicki L. Henry 31 May 94
Vicki L. Henry

DECLARATION UNDER 37 C.F.R. §1.132

Commissioner of Patents
and Trademarks
Washington, DC 20231

Sir:

The undersigned, Joseph P. Hammang, hereby declares and states that:

1. I am currently working as a scientist at CytoTherapeutics Inc. in Providence, Rhode Island. My Curriculum Vitae is attached hereto.

2. I am a co-inventor of the captioned application and I have read the arguments in the outstanding Official Action, dated December 2nd 1993, wherein the Examiner rejected Claims 1-17 under 35 U.S.C. § 101 because evidence has not been presented to show that the invention works as claimed.

3. I have diligently performed or supervised experiments that show that neural stem cells isolated from donor tissue can be proliferated in a culture

medium containing a growth factor to produce precursor cells. The precursor cells can be harvested and transplanted into a myelin-deficient recipient wherein the precursor cells can differentiate into oligodendrocytes and remyelinate the axons of the recipient.

4. In these experiments, multi-potential EGF-responsive stem cells were isolated from the striata of E14-15 rats and mice and propagated in a defined, serum-free medium containing 20 ng/ml EGF. Nestin positive cells (i.e. no mature oligodendrocytes) were collected and triturated into a single cell suspension in the presence of 0.1% BSA. This suspension was concentrated to 50,000 cells/μl and one microliter of cells was injected into the dorsal columns of the T13/L1 region of the spinal cord of myelin deficient rats. Those animals transplanted with the mouse stem cells received Cyclosporin A at a dose of 10mg/Kg lp for the duration of the experiment.

5. Thirteen or fourteen days after injection, the animals were euthanized by perfusion fixation, the spinal cords removed and the tissue examined by light and electron microscopy. Patches of myelin were found in the dorsal columns of the recipients of both rat and mouse cells, indicating that neural stem cells isolated from rat and mouse neural tissue can differentiate into oligodendroglia and are capable of myelination *in vivo*.

6. The methods described in paragraphs 4 and 5 above are substantially the same as those disclosed in Example 2 (p. 17 to 18 of the specification) with only minor changes in the procedure (e.g. the rats were allowed to survive 2 weeks post-injection rather than 3 weeks; the rats were treated with antibiotics post-injection).

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that willful, false statements may jeopardize the validity/enforceability of the application or any patent issued thereon.

Dated: 3/31/94 Signature: Joseph P. Hammang

Joseph P. Hammang, Ph.D.

Curriculum Vitae

JOSEPH P. HAMMANG
3 Prospect Street
Barrington, RI 02806
(401) 246-1893

Employment:

Principal Scientist /Assoc. Dir. Neuro & Molecular Biology)
May 1993 - Present
CytoTherapeutics, Inc., Providence, Rhode Island
Scientist - (June 1992 - May 1993)

Research Investigator I - CNS Cell and Molecular Neurobiology
Bristol-Myers Squibb Company
Pharmaceutical Research Institute,Wallingford, Connecticut
December 1991 - May 1992

Postdoctoral Fellow - CNS Cell and Molecular Neurobiology
Bristol-Myers Squibb Company
Pharmaceutical Research Institute, Wallingford, Connecticut
January 1991 - December 1991

Ph.D. Research Assistant - University of Wisconsin
School of Veterinary Medicine
Department of Pathobiological Sciences, Madison, Wisconsin
January 1988 to January 1991

Associate Researcher - University of Wisconsin
School of Veterinary Medicine
Department of Medical Sciences, Madison, Wisconsin
March 1987 - January 1988

Specialist - Life Sciences Research
University of Wisconsin - School of Veterinary Medicine
Department of Medical Sciences, Madison, Wisconsin
May 1983 - March 1987

Education:

Ph.D. - University of Wisconsin - Madison
Department of Veterinary Science (area of Neuroscience)

Master of Science - Zoology
June 1983, University of Wisconsin-Oshkosh

Bachelor of Science
May 1980, University of Wisconsin-Oshkosh
Major: Biology with emphasis in Zoology

Professional Honors:

Recipient of University of Wisconsin-Madison
Academic Staff Professional Development Grants
Years 1985/86 and 1986/87

Teaching Assistantships:

Taught lab and discussion of course entitled "Human Biology" - an introductory biology course with a human perspective for Nursing, Psychology, Social Work and Physical Education majors. Spring 1982

Taught lab and discussion of course entitled "Man in the Biosphere" - Fall 1981 - an introductory level biology course, ecologically oriented for non-majors.

Related Experiences:

Research Assistantship in Biology. Worked in electron microscopy lab. School year 1980-1981.

Biology internship with Wisconsin Department of Natural Resources, Oshkosh. Worked as assistant in Warm Water Fisheries Research Unit. Included radio telemetry, cartography and fish management techniques. Interned 12 weeks.
Summer of 1980.

University of Wisconsin-Oshkosh Department of Biology. Worked as lab assistant in setting up labs and reagent mixing for animal and human physiology courses. September 1979 to May 1980.

University of Wisconsin-Oshkosh Department of Chemistry. Worked as lab preparation assistant. September 1978 to May 1979.

University of Wisconsin-Fond du Lac. Worked as lab preparation assistant in Chemistry. September 1977 to August 1978.

Professional Memberships:

Society for Neuroscience
Sigma Xi
AAAS
American Society for Cell Biology

Activities:

College - Inducted as associate member of Sigma Xi
Scientific Research Society of America, Spring 1983
President of Iota Phi Chapter of Beta Beta Beta Biological Honor Society 1979-1980
Member of UW-Oshkosh Biology Club 1978-1982

Honors and Achievements:

Honor roll three semesters UW-Oshkosh

Community:

Volunteer as counselor for Badger Boys State Ripon, Wisconsin - June of 1975, 1976 and 1977.

Volunteer as co-advisor for environmental and ecology post of Explorer Scouts, Oshkosh, Wisconsin. Conducted tours and field trips - May 1980 to May 1982.

Workshop leader for "College for Kids" program (Neurobiology), University of Wisconsin-Madison, Summers of 1986, 1987, 1988, 1989, and 1990.

Research Skills:

Primary neuronal culture preparation; Mammalian cell culture; DNA transfection - primary cells and cell lines; Immuno-cytochemistry and immunohistochemistry; Electron microscopy and specimen preparation; Autoradiography; Histological preparations; CNS microinjection; Western blotting; Northern blotting; In situ hybridization; Production of rabbit polyclonal antisera; Photomicroscopy and micrograph preparation.

Research Symposium Presentations:

Presented preliminary research for M.S. thesis at the 18th annual Lake Superior Biological Conference, September 25-26, 1981 at Marquette, Michigan. Title: Ultrastructural anatomy of the urinary bladder of the freshwater teleost, Lota lota (Linnaeus).

Presented preliminary results of Masters research at the American Society of Zoologists annual meeting, December 27-30, 1982 at Louisville, Kentucky. Title: Morphology and ultrastructure of the urinary bladder of the burbot, Lota lota (Linnaeus).

Presented final results of the M.S. thesis research at the American Fisheries Society, Wisconsin Chapter meeting, March 11-12, 1983 at the Institute of Paper Chemistry in Appleton, Wisconsin. Title: Ultrastructural evidence for the physiological function of the urinary bladder of the burbot, Lota lota (Linnaeus).

The nervous system beyond paraffin. I.D. Duncan and J.P. Hammang. Co-presented to the National Histology Society, Region IV Meeting, Milwaukee, Wisconsin, June 1984.

The Shaking Pup: A canine central nervous system myelin mutant. I.D. Duncan, J. Hammang, K. Lord, and K. Dyer. Presented to the American College of Veterinary Pathologists and the Annual Meeting of the American Society of Veterinary Clinical Pathologists. Toronto, Ontario, Canada, November 1984.

The effect of tellurium on intraspinal axons myelinated by Schwann cells. J.P. Hammang, Presented at the Upper Midwest Peripheral Nerve Meeting, Mayo Clinic, Rochester, MN. November 1984.

Light microscopic and ultrastructural studies on the equine recurrent laryngeal nerve. I.D. Duncan and J.P. Hammang, University of Wisconsin-Madison. Presented to the Peripheral Nerve Study Group Meeting, September 9-12, 1985, Murren, Switzerland.

Identification of animal cells and cellular structures using specialized immunocytochemical techniques. J.P. Hammang. Presented to the Wisconsin Histology Society, Madison, Wisconsin, May 1986.

Presented preliminary Ph.D. research at the Mouse Molecular Genetics Conference, Cold Spring Harbor Laboratory, August 1988.

Invited Reviews:

E.E. Baetge, J.P. Hammang, V.K. Gribkoff and K.F.Meiri. The role of GAP-43 in the molecular regulation of axon outgrowth and electrophysiological properties. Perspectives on Developmental Neurobiology, 1992, 1 (1), p.21-28.

Immortalized cell lines from targeted oncogene expression in transgenic mice. J.P. Hammang, E.E. Baetge, A. Messing. NeuroProtocols, 1993, 3 p. 176-183.

Refereed Publications:

Peripheral Neuropathy in two dogs: Correlation between clinical, electrophysiological and pathological findings. K.R. Dyer, I.D. Duncan, J.P. Hammang and R.R. Dubielzig. J. of Small Animal Practice 1986, 27, 133-146.

Degenerative changes in rat intraspinal Schwann cells following tellurium intoxication. J.P. Hammang, I.D. Duncan and S.A. Gilmore. Neuropathol. and Appl. Neurobiol. 1986, 12, 359-370.

Myelin deficient rat: analysis of myelin proteins. K. Yanagisawa, I.D. Duncan, J.P. Hammang and R.H. Quarles. J. Neurochem., 1986, 47, No. 6, 1901-1907.

Myelin mosaicism in female heterozygotes of the canine shaking pup and myelin deficient rat mutants. I.D. Duncan, J.P. Hammang and K.F. Jackson. Brain Res., 1987, 402, 168-172.

Node-like axonal undercoating in the optic nerve of heterozygous myelin deficient rats. W.F. Blakemore, I.D. Duncan and J.P. Hammang. Brain Res., 1987, 403, 361-365.

Ultrastructural observations of organelle accumulations in the equine laryngeal nerve. I.D. Duncan and J.P. Hammang. J. Neurocytology, 1987, 16, No. 2, 269-280.

Subclinical entrapment neuropathy of the equine suprascapular nerve. I.D. Duncan, R.K. Schneider and J.P. Hammang. ACTA Neuropathol., 1987, 74, 53-61.

Abnormal compact myelin in the myelin deficient rat; absence of proteolipid protein corresponds with a defect in the intraperiod line. I.D. Duncan, J.P. Hammang and B.D. Trapp. Proc. Nat. Acad. Sci. (USA), 1987, 84, 6287-6291.

Transplantation of oligodendrocytes and Schwann cells into the spinal cord of the myelin deficient rat. I.D. Duncan, J.P. Hammang, K.F. Jackson, P.M. Wood, R.P. Bunge and L. Langford. J. Neurocytology, 1988, 17, 351-360.

Schwann cell myelination of the myelin deficient rat spinal cord following x-irradiation. I.D. Duncan, J.P. Hammang and S.A. Gilmore. Glia, 1988, 1, No. 3, 233-239.

Proliferation of rat intraspinal Schwann cells following tellurium intoxication. J.P. Hammang, S.F. Worth, I.D. Duncan and S.A. Gilmore. Acta Neuropathol., 1988, 76, 624-627.

Myelination in the jimpy mouse in the absence of proteolipid protein. I.D. Duncan, J.P. Hammang, S. Goda and R.H. Quarles. Glia, 1989, 2, 148-154.

Hypomyelination in the neonatal rat central and peripheral nervous systems following tellurium intoxication. K.F. Jackson, J.P. Hammang, S.F. Worth and I.D. Duncan. Acta Neuropathol., 1989, 78, 301-309.

Immortalized retinal neurons derived from SV40 T-antigen-induced tumors in transgenic mice. J.P. Hammang, E.E. Baetge, R.R. Behringer, R.L. Brinster, R.D. Palmiter and A. Messing. Neuron, 1990, 4 (5), 775-782.

Neurite outgrowth in PC12 cells deficient in GAP-43. E.E. Baetge and J.P. Hammang. Neuron, 1991, 6 (1), 21-30.

Immortalized retinal neurons used as immunogen for the generation of cell-specific antisera. J.P. Hammang and A. Messing. Brain Research, 1991 556, 85-94.

Phenylethanolamine N-methyltransferase (PNMT)-expressing horizontal cells in the rat retina: a study employing double-label immunohistochemistry. J.P. Hammang, M.C. Bohn and A. Messing. J. Comp. Neurol., 1992, 316, 383-389.

Po promoter directs expression of reporter and toxin genes to Schwann cells of transgenic mice. A. Messing, R.R. Behringer, J.P. Hammang, R.D. Palmiter, R.L. Brinster, and G. Lemke. Neuron, 1992, 8, 507-520.

Oncogene expression in retinal horizontal cells of transgenic mice results in a cascade of neurodegeneration. J.P. Hammang, R.R. Behringer, E.E. Baetge, R.L. Brinster, R.D. Palmiter and A.Messing. Neuron, 1993, 10, p. 1197-1209.

Development of myelin mosaicism in the optic nerve of heterozygotes of the X-linked myelin-deficient rat mutant (*md*). I.D. Duncan, K.F. Jackson, J.P. Hammang, D. Marren, R. Hoffman. Developmental Biology, 1993, 157, p. 334-347.

Immortalization of embryonic rat hippocampal cells following infection by an amphotropic retrovirus containing the adenoviral E1A gene. R.J. Robbins, E.E. Baetge, D.L. Needels, G. P. Dotto and J.P. Hammang, (submitted).

The mouse neurofilament-L promoter confers neuron-specific expression of a ß-galactosidase reporter gene in primary neuronal and glial cell cultures. J.P. Hammang, C.M. Sampson, D.L. Needels and E.E. Baetge, (submitted).

Derivation of adrenergic adrenal chromaffin cell lines from the targeted expression of a PNMT-SV40 fusion gene. J.P. Hammang et al., (in preparation).

Hypomyelinating peripheral neuropthies and Schwannomas in transgenic mice expressing SV40 T-antigen. A. Messing, R. R. Behringer, L. Wrabetz, J. P. Hammnag, G. Lemke, R. D. Palmiter and R. L. Brinster. J. Neuroscience (1994) (in press).

EGF-Responsive neural stem cells isolated from rat and mouse brain can form myelin following transplantation into the myelin-deficient rat CNS. J. P. Hammang, D. R. Archer, and I. D. Duncan (1994) (In preparation).

Polymer encapsulated cells genetically modified to secrete human nerve growth factor promote the survival of axotomized septal cholinergic neurons. S. R. Winn, J. P. Hammang, D. F. Emerich, A. Lee, R. D. Palmiter and E. E. Baetge. 1994, PNAS March.

Delivery of a putative Parkinson's factor (GDNF) into the rat CNS using apolymer-encapsulated cell line. J. P. Hammang, D. F. Emerich, S. R. Winn, A. Lee, M. D. Lindner, M. Schinstine adn E. E. Baetge. (In preparation).

Reduced electrical excitability of PC 12 cells deficient in GAP-43: comparison with GAP-43-positive cells. V. K. Gribkoff, J. P. Hammang, and E. E. Baetge, 1994 (submitted).

Mutagensis of serine[41] to alnine inhibits the association of GAP-43 with the membrane skeleton of GAP-43- deficient PC12 β cells: Effects on cell adhesion, and the composition of neurite cytoskeleton and membrane. K. F. Meiri, J. P. Hammang, E. W. Dent, and E. E. Baetge. J. Cell Biol. 1994 (submitted).

Published
Abstracts:

1. An Immunocytochemical investigation of myelin proteins in the Shaking Pup I.D. Duncan, J.P Hammang and B. Trapp. J. Neuropathol. and Exp. Neurol., 1984, 43, 328.

2. The effect of elemental tellurium (Te) on rat intraspinal Schwann cells. J.P. Hammang, I.D. Duncan and S.A. Gilmore. J. Neuropathol. and Exp. Neurol., 1985, 44, 332.

3. Subclinical entrapment neuropathy of the equine suprascapular nerve. J.P. Hammang and I.D. Duncan. J. Neuropathol. and Exp. Neurol., 1986, 65, 370.

4. Mosaicism in the CNS of the myelin mutants, the shaking pup and the myelin deficient (md) rat. I.D. Duncan, J.P. Hammang and K.F. Jackson. J. Neuropathol. and Exp. Neurol., 1986, 65, 383.

5. Heterozygotes of the shaking pup and myelin deficient (md) rat mutants show mosaicism in the CNS. I.D. Duncan, J.P. Hammang and K.F. Jackson. Abstracts of X International Congress on Neuropathology, Stockholm, Sweden, September 1986.

6. Peripheral neuropathy in SV40 transgenic mice: Immunohisto-chemical studies of myelin proteins. A Messing, J.P. Hammang, I.D. Duncan, C.A. Pinkert, R.D. Palmiter and R.L. Brinster. Society for Neuroscience, 1986 Abstracts, 12, p. 264.

7. Glial cell division in the optic nerve of the myelin deficient rat. K.F. Jackson, J.P. Hammang and I.D. Duncan. Society for Neuroscience, 1986 Abstracts, 12, p. 1584.

8. Schwann cell myelination in the myelin-deficient rat spinal cord. I.D. Duncan, J.P. Hammang and S.A. Gilmore. Society for Neuroscience, 1986 Abstracts, 12, p. 160.

9. Ultrastructural changes in granulosa cells of Chrysemys picta after a single injection of LH-RH. I.Y. Mahmoud, R.V. Cyrus, M.J. Woller and J.P. Hammang. American Zoologist, 1986, 26, No. 4, 3A.

10. Transplantation of Schwann cells and oligodendrocytes into the spinal cord of the myelin deficient rat. I.D. Duncan, J.P. Hammang, K.F. Jackson, L. Langford, P.M. Wood and R.P. Bunge. J. Neuropathol. and Exp. Neurol., 1987, 46, 351. (Honorable mention, Weil Award for best research paper.)

11. Proliferation of intraspinal Schwann cells in tellurium intoxicated rats. J.P. Hammang, I.D. Duncan, S.F. Worth and S.A. Gilmore. J. Neuropathol. and Exp. Neurol., 1987, 46, 357.

12. Jimpy myelin lacks PLP and has a defect in the intraperiod line. I.D. Duncan, J.P. Hammang and K.F. Jackson. Society for Neuroscience, 1987 Abstracts, 13, p. 118.

13. Tellurium-induced hypomyelination in the neonatal rat central and peripheral nervous systems. J.P. Hammang, S.F. Worth and I.D. Duncan. Society for Neuroscience, 1987 Abstracts, 13, p. 698.

14. Further observations on the glial cell population of the optic nerve of the myelin deficient rat. K.F. Jackson, J.P. Hammang and I.D. Duncan. Society for Neuroscience, 1987 Abstracts, 13, p. 885.

15. Myelin mosaicism in the optic nerve of the myelin deficient rat heterozygote. I.D. Duncan, J.P.Hammang, K.F. Jackson and S.F. Worth. J. Neuropathol. and Exp. Neurol., 1988, 47, p. 384.

16. Derivation of neuronal cell lines from retinal and adrenal tumors in PNMT-SV40 transgenic mice. J.P. Hammang, R.R. Behringer, E.E. Baetge, R.D. Palmiter, R.L. Brinster and A. Messing. Society for Neuroscience, 1988 Abstracts, 14, p. 473.

17. Schwann cell-specific gene expression in transgenic mice. A. Messing, R.R. Behringer, J.P. Hammang, G. Lemke, R.L. Brinster and R.D. Palmiter. J. Neuropathol. and Exp. Neurol., 1989. (Weil Award for best research paper.)

18. An immortalized line of retinal neurons derived from PNMT-SV40 transgenic mice. J.P. Hammang, E.E. Baetge, R.R. Behringer, E.P. Sandgren, R.D. Palmiter, R.L. Brinster and A. Messing. Society for Neuroscience, 1989 Abstracts, 15, p. 1396.

19. PC12 cells devoid of GAP-43 protein synthesize a truncated form of GAP-43 mRNA. E.E. Baetge, C.M. Sampson and J.P. Hammang. Society for Neuroscience, 1990 Abstracts, 16, p. 812.

20. Electrophysiological properties of GAP-43-containing and GAP-43-negative PC12 cells exposed to NGF. V.K. Gribkoff, E.E. Baetge and J.P. Hammang. Society for Neuroscience, 1990 Abstracts, 16, p. 813.

21. Distribution of myelin patches in the mosaic optic nerves of the myelin deficient rat heterozygote. I.D. Duncan, J.P. Hammang, K.F. Jackson, D. Marren, and C. Iida. Society for Neuroscience, 1990 Abstracts, 16, p. 665.

22. The C6 glioma cell line expresses the growth-associated protein GAP-43 in a developmentally regulated fashion. J.P. Hammang, A. Messing and E.E. Baetge. Society for Neuroscience, 1990 Abstracts, 16, p. 812.

23. Transgenic ablation of Schwann cells during development. A. Messing, G. Lemke, R.R. Behringer, J.P. Hammang, R.D. Palmiter and R.L. Brinster. Society for Neuroscience, 1990 Abstracts, 16, p. 1167.

24. Altered organization of intermediate filament proteins in GAP-43 deficient PC12(B) cells. J.P. Hammang, K.F. Meiri and E.E. Baetge. Society for Neuroscience, 1991 Abstracts, 17, p. 1310.

25. Abnormal neurite extension in GAP-43 deficient PC12 cells stably transfected with mutated (SER^{41}-ALA^{41})GAP-43. E.E. Baetge, L.E. Bickerstaff, K.M. Felsenstein, J.P. Hammang and K.F. Meiri. Society for Neuroscience, 1991 Abstracts, 17, p. 1309.

26. Phenylethanolamine N-methyltransferase-expressing adrenal chromaffin cell lines derived from PNMT-SV40 transgenic mice. A. Messing, E.E. Baetge and J.P. Hammang. Society for Neuroscience, 1991 Abstracts, 17, p. 38.

27. Characterization of the mouse neurofilament L (NF-L) promoter in primary neuronal cell cultures. J.P. Hammang, C.M. Sampson, D.L. Needels and E.E. Baetge. J. Cell Biol. 1991 115(3), Part 2, p. 396a.

28. Trophic effects of neurotrophin-3 on hippocampal neurons. D.L. Needels, M.E. McGuire, S.B. Roberts, K.M. Ingalls and J.P. Hammang. Society for Neuroscience, 1992 Abstracts, 18, p. 44.

29. Trophic effects of neurotrophin-3 on astrocytes in mixed cell cultures from fetal rat hippocampus. M.E. McGuire, D.L. Needels, S.B. Roberts, K.M. Ingalls and J.P. Hammang. Society for Neuroscience, 1992 Abstracts, 18, p. 44.

30. EGF-generated mouse striatal neurospheres express the trk neurotrophin receptor. J.S. Williams, A. Vescovi, B.A. Reynolds, J.P. Hammang, E.E. Baetge, and S. Weiss. Society for Neuroscience, 1992 Abstracts, 18, p. 217.

31. GAP-43 is developmentally regulated in glial cells derived from EGF responsive CNS stem cells. J.P. Hammang, B.A. Reynolds, E.E. Baetge and S. Weiss. Society for Neuroscience, 1992 Abstracts, 18, p. 217.

32. Targeted oncogenes in neuronal and neuroendocrine cells using the PNMT promoter in transgenic mice. J.P. Hammang, E.E. Baetge and A. Messing. International Society for Developmental Neuroscience, June 1992.

33. Oncogene expression in retinal horizontal cells of transgenic mice results in a cascade of neurodegeneration. J.P. Hammang, R.R. Behringer, E.E. Baetge, R.D. Palmiter, R.L. Brinster and A. Messing. Cold Spring Harbor Laboratory, Mouse Molecular Genetics, August 1992.

34. Transplantation of encapsulated PC12 cells into non-human primate brain. B. R. Frydel, M. J. Banks, V. Hovanesian, S. R. Winn, S. D. Sherman, D. F. Emerich, P. E. McDermott, B. J. Dean, J. P. Hammang, F. Gentile, E. J. Doherty and E. E. Baetge. Soceity for Neuroscience, 1993 Abstracts, 19, p. 56.

35. Development of a polymer-encapsulated cellular implant for pain modulation. S. R. Winn, S. D. Sherman, S. A. Morrison, J. Harvey, A. Lee, J. Sagen, J. P. Hammang, and E. E. Baetge. Soceity for Neuroscience, 1993 Abstracts, 19, p. 1410.

36. Release of CNTF from encapsulated transfected BHK cells and from polymer rods. S. A. Tan, V. Padurn, A. C. Kato, A. D. Zurn, R. Palmiter, B. Bamber, J. P. Hammang, E. E. Baetge, P. Aebischer. Society for Neuroscience, 1993 Abstracts, 19, p. 197.

37. Long-term expression of nerve growth factor from polymer encapsulated cells in the rat CNS. J. P. Hammang, B. J. Dean, A. Lee, D. F. Emerich, S. R. Winn, B. Bamber, R. D. Palmiter, and E. E. Beatge. Society for Neuroscience, 1993 Abstracts, 19, p. 657.

38. CNTF, LIF and oncostatin M increase the number of oligodendrocytes in cultures of EGF-generated CNS progenitor cells. B. A. Reynolds, J. P. Hammang, E. E. Baetge and S. Weiss. Society for Neuroscience, 1993 Abstracts, 19, p. 870.

39. The delivery of neurotrophic factors to the nervous system using polymer encapsulated cells. E. E. Baetge, S. R. Winn, A. Lee, B. J. Dean, B. Bamber, R. D. Palmiter and J. P. Hammang. Soceity for Neuroscience, 1993 Abstracts, 19, p. 657

40. EGF- responsive neural stem cells isolated from rat and mouse brain are capable of differentiating into oligodendrocytes and of forming myelin following transplantation into the myelin deficient rat. I. D. Duncan, D. R. Archer and J. P. Hammang. Society for Neuroscience, 1993 Abstracts, 19, p. 689.

41. Generation of a transformed cell-line with a neuronal phenotype from RIPTag transgenic mouse insulinoma. D. Fiore, D. Knaack, C. R. Greco, O. D. Negre, and J. P. Hammang. American Society for Cell Biology, 1993 Abstracts, 4, p. 375a.

42. Delivery of putative Parkinson's factor (GDNF) into the rat CNS using a polymer-encapsulated cell line. E. E. Baetge, D. F. Emerich, S. R. Winn, A. Lee, M. D. Lindner and J. P. Hammang. American Society for Cell Biology, 1993 Abstracts, 4, 442a.

43. EGF-responsive neural stem cells derived from MBP-*lac* Z transgenic mice can express the transgene in differentiating oligodendrocytes. J. P. Hammang, L. G. Wrabetz, J. Kamholz and A. Messing. American Society for Cell Biology, 1993 Abstracts, 4, p. 374a.